935,748

PATENT SPECIFICATION

DRAWINGS ATTACHED

935,748

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COMPLETE SPECIFICATION

Rotary Cutter

I, LUDWIN OPPOLD, a German National, of Oberkochen, Württemberg, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to rotary cutters for the machining of wood, synthetic plastics or the like, the cutter having one or more plate-shaped blades each located in a peripheral recess or pocket in a rotatable disc, the cutting edges of the blades projecting from the periphery of the disc.

If such tools are rotated at very high speeds, for example 6,000—12,000 revolutions per minute, the danger exists that the blades, a plurality of which may be distributed around the disc, may be thrown outwardly by centrifugal force. In order to prevent this, some blade-locking means must be provided. In practice, it is possible to satisfy this requirement only with difficulty or in complicated fashion, because the cutting blades have to be removable for sharpening by re-grinding, as a result of which the distance between cutting edge and the locking means can vary and thus the restoration of the same circle of movement is difficult; above all this is the case where a guard member is located in advance of each blade which is integral with the disc.

According to the invention there is provided a rotary cutter comprising a disc formed with one or more peripheral recesses within each of which is located a cutter blade with its cutting edge outwardly of the periphery of the disc, and a locking plate engaging against the back face of the blade and abutting a projecting on said back face, said plate having locking lugs extending rearwardly thereof and engaging beneath projections formed on the respective side faces of the disc at the periphery thereof.

It may be desirable that the locking plate is coupled by means of blade centring means to the blade back. Thus, for example, on the blade back there may be provided a centring pin which engages in a longitudinal slot in the locking plate. In modification, lugs on the locking plate cooperate with channel members on the back of the blade or embrace the side edges of the blade.

The invention is illustrated by way of example in the accompanying drawing, in which

Figure 1 is a side view of the rotary cutter, the lower part of the Figure showing a modification;

Figure 2 is an enlarged rear perspective view of the cutter blade and locking plate;

Figure 3 is a fragmentary face view of the locking plate seen in the direction A—B of Figure 1; and

Figures 4 to 6 are detail views showing three different arrangements for maintaining alignment of the cutter blade and locking plate, Figures 4 and 6 being end views looking towards the cutting edge back face in the longitudinal direction of the blade and Figure 5 being a view looking on the front cutting edge face of the blade.

Referring firstly to Figure 1, a steel disc 6 secured to a driving shaft 9 is provided on each side face thereof with a pair of peripheral flanges 7, 8 formed by machining away the surfaces of the disc inwardly of said flanges. The flanges extend between a pair of diametrically opposite recesses 10, 11 (any other number of recesses may be provided) within each of which is located a cutter blade 15, only the upper blade being shown. Each recess is undercut so as to have, in the direction of rotation of the disc, a greater length at its base than at its mouth. The front cutting edge face of each blade is engaged by a wedge-shaped clamping block 12 and the back face of the blade is engaged by a locking plate 16. The clamping block 12 abuts the obliging front wall of the recess 10

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or 11 and carries a grub screw 13 which engages against the base wall of the recess so as to enable said clamping block to be adjusted radially inwardly and outwardly of the recess.

The locking plate 16, the purpose of which is to secure the blade with its cutting edge 21, which may be of any desired contour, projecting to the required extent beyond the periphery of the disc and which abuts the oblique rear wall of the recess, has its inner end 17 seating on a transverse lip 18 formed on the back face of the blade at the inner end thereof (see also Figure 2). On each side edge of plate 16 is a lug 19 or 20 which projects rearwardly beyond the back face of the plate so as to engage the inner annular surface of the flange 8 (or 7). Thus when the grub screw 13 is tightened to move the clamping block 12 outwardly of the recess into the clamping position, the blade 15 will be securely held against outward displacement under the centrifugal force, even at speeds up to 12,000 r.p.m., by the interposition of the locking plate between the plate lip 18 and the disc flanges.

The outer end face 24 of the locking plate 16 is chamfered to the same angle as the cutting edge back face 22 of the cutter blade 15 so that said two faces 22, 24, as is clear from Figure 2, lie in a common plane. The other end face 23 of the locking plate is also chamfered to the same angle as the faces 22, 24. When the cutter blade is to be sharpened by grinding the cutting edge back face 22, the locking plate is first inverted so that the end faces 23, 24 are transposed. The two co-planar faces 22, 23 are then ground simultaneously, after which the locking plate is returned to the position shown. As a similar thickness of metal is thus removed from the faces 22, 23, it will be evident that after each sharpening operation the cutting edge 21 will occupy the same position and traverse the same cutting circle, since the blade lip 18 will be displaced outwardly by a distance equal to the thickness of metal removed from the end face 23 of the locking plate and so compensate for the thickness of metal removed from the blade face 22. Thus the depth of cut will remain constant regardless of how often the blade has to be resharpened or the amount of metal removed. If desired, the lip 18 may be undercut to the same angle as the face 23.

To prevent injury to the operator if his hand should accidentally come too close to the path of the cutting edge 21, a guard or deflector plate 35 may be secured between the clamping block 12 and the front end wall of the recess 10 or 11, as shown in chain lines at the top of Figure 1. The outer end of plate 35 is chamfered and the plate is arranged in mirror-image fashion in relation to the blade 15, so that the chamfered surface will deflect the operator's hand out of the path of the cutter blade. The tip of the guard plate traverses an operating circle of slightly smaller radius than the cutting edge 21.

Instead of forming the flanges 7, 8 continuously between the recesses 10, 11, the side faces of the disc 6 may be cut away adjacent the ends of said recesses as shown at the bottom of Figure 1 at 36, 37. When the locking plate lugs 19, 20 are located within the cutaway surfaces 36, 37 they engage against the shortened flange portions 7a, 8a and thus secure the locking plate in the operative position.

In addition to the means described above for securing the blade 15 against outward displacement under the effect of the centrifugal force, it is desirable to ensure that the blade is accurately located and secured in its transverse direction relative to the disc 6. For this purpose, as shown in Figure 4, the back face of the blade 15 is formed with a central groove 26 which extends longitudinally of the blade and within which is engaged a rib 27 provided on the front face of the locking plate 16.

Figure 5 shows a modification of Figure 4, where a pin 28 projecting from the back face of the blade is located within a slot 29 in the locking plate. Figure 6 shows still another modification, in which the locking plate 30 is provided adjacent its side edges with projections which extend both rearwardly from the plate to form lugs 31 corresponding to the lugs 19, 20 of Figure 1 and forwardly from the plate to form lugs 32 which engage in channel members on the back face of the blade. Alternatively the lugs 32 may embrace the side edges of the blade.

WHAT I CLAIM IS:—

1. A rotary cutter comprising a disc formed with one or more peripheral recesses within each of which is located a cutter blade with its cutting edge outwardly of the periphery of the disc, and a locking plate engaging against the back face of the blade and abutting a projection on said back face, said plate having locking lugs extending rearwardly thereof and engaging beneath projections formed on the respective side faces of the disc at the periphery thereof.

2. Rotary cutter as claimed in claim 1 wherein the blade and the locking plate are provided with interengaging means by which the blade is transversely centered relative to the plate.

3. Rotary cutter as claimed in claim 2, wherein the said centering means comprises a pin projecting from the back face of the blade and engaged in a longitudinal slot in the locking plate.

4. Rotary cutter as claimed in claim 2,

wherein the said centering means comprises a longitudinal rib on the locking plate engaging within a groove in the back face of the blade.

5. Rotary cutter as claimed in claim 2, wherein the centering means comprises a lug at each side edge of the locking plate engaging in longitudinal channel members on the back face of the blade.

6. Modification of the rotary cutter claimed in claim 5, wherein the lugs embrace the side edges of the blade.

7. Rotary cutter as claimed in any one of the preceding claims, wherein the end of the locking plate abutting the projection on the back face of the cutting blade is ground to form an angle at the front face of said plate equal to the angle at the cutting edge of the blade.

8. Rotary cutter as claimed in claim 7, wherein the projection on the back face of the cutting blade is undercut at that edge engaged by the locking plate to an angle equal to that at the end of said plate which abuts said projection.

9. Rotary cutter as claimed in any one of the preceding claims, wherein the projections on the side faces of the disc are formed as annular flanges.

10. Rotary cutter as claimed in claim 9, wherein the flanges on the side faces of the disc are formed by cutting away said side faces of said disc adjacent the ends of the or each blade-locating recess.

11. Rotary cutter as claimed in any one of the preceding claims, wherein a guard plate is positioned in the blade-locating recess forwardly of the blade and with its outer end traversing a circle smaller than that of the cutting edge of the blade, said guard plate being secured between the forward end wall of the said recess and a blade-clamping member engaging the front face of the blade.

12. Rotary cutter as claimed in claim 11, wherein the guard plate is chamfered at its outer end and is arranged in mirror-image fashion relative to the blade.

13. Rotary cutters substantially as hereinbefore described with reference to the accompanying drawing.

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935,748 COMPLETE SPECIFICATION
1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

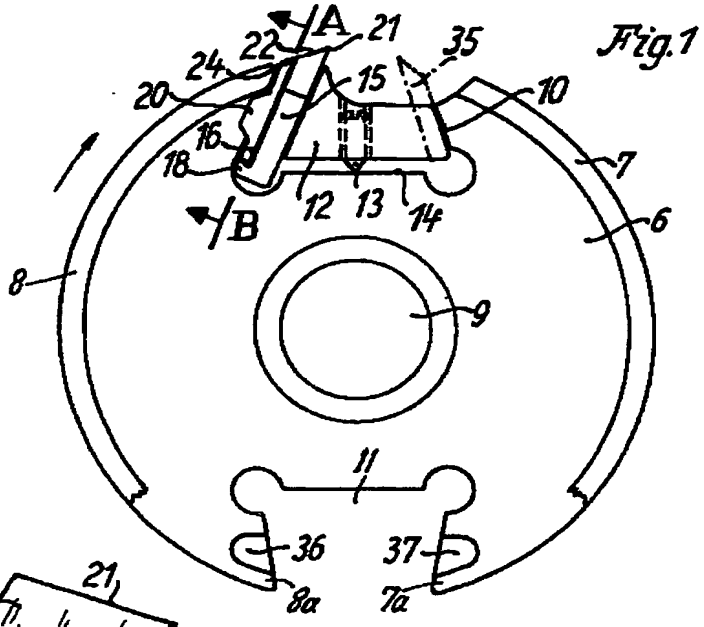

Fig.1

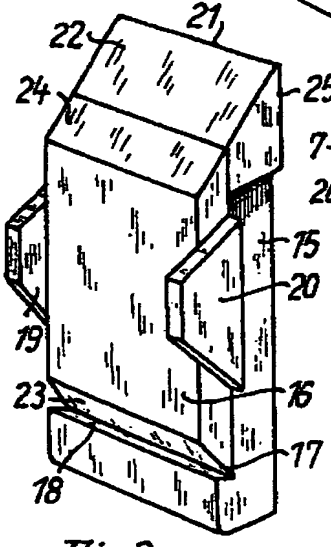

Fig.2

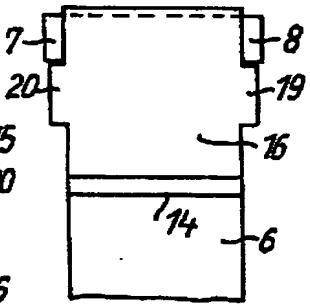

Fig.3

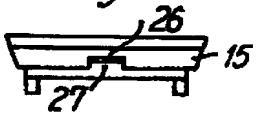

Fig.4

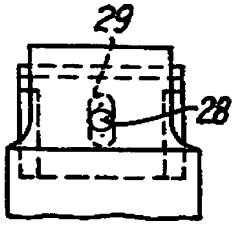

Fig.5

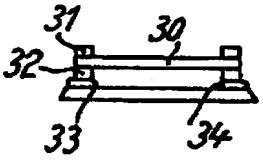

Fig.6